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DEVELOPMENT IN SCIENCE EDUCATION

Guide for the Preparation of Proposals

**National
Science
Foundation
Washington, D.C.**

Apply to:

National Science Foundation
Directorate for Science Education
Division of Science Education
Development and Research
Washington, D.C. 20550

SPECIAL ACTIVITIES RELATED TO SCIENCE EDUCATION DEVELOPMENT AND RESEARCH

Supplementary to the regular competition for Development in Science Education (DISE) funds, the Division of Science Education Development and Research (SEDR) is open to inquiries about potential projects that do not fit the requirements established for existing programs, or that seem to overlap two or more programs.

The Division will entertain such proposals if the project:

1. relates to the broad objectives of the Division;
2. falls outside the guidelines of existing programs of the Directorate for Science Education, including the Research in Science Education and Development in Science Education Programs (see SE 80-1, Guide to Science Education Programs or NSF 79-36, Guide to Programs Fiscal Year 1980); and
3. shows promise of providing information and experience useful in improving the effectiveness of existing programs of the Science Education Directorate, or in designing new ones for the future.

Proposals meeting these criteria will be considered individually and may be submitted at any time. Before preparing a proposal, prospective applicants should establish initial contact by a brief letter or inquiry that describes the intended project. Address such letters to

Division of Science Education Development and Research
National Science Foundation
Washington, D. C. 20550

IMPORTANT INFORMATION FOR PROPOSERS

Preliminary proposals may be submitted at any time. However, previous Program experience indicates that processing of proposals takes at least 7 to 9 months from date of receipt of a preliminary proposal to date of award, if an award is made. Therefore, proposers who wish to start project work at the beginning of an academic year (September or October) should plan to submit a preliminary proposal in the previous October, November or December. For calendar year or second academic semester starts, preliminary proposals are best submitted in the previous January, February or March. For summer starts, preliminary proposals should be submitted in July, August, or September.

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CONTENTS

I. Purpose of the Program 1

II. Eligibility Considerations 4

III. Preparation of Preliminary Proposals 6

IV. Preparation of Formal Proposals 7
  Intent to Submit Card 7
  Proposal Format 7
  Cover Page 7
  Project Summary 7
  Budget Matters 7
  Narrative 7
  Other Commitments of Senior Personnel 8
  Appendices 8

V. Submission of Formal Proposals 9

VI. Proposal Evaluation 9
  Method of Selection 9
  Evaluation Criteria 9
  Reviews 9

VII. Other Considerations 10
  Assurance of Compliance with Civil Rights Act 10
  Grantee Organization and Management Data 10
  Human Subjects 10
  Pre-College Students and Experimental Curriculum Development Projects 10
  Access to Peer Review Information 10
  Privileged Information 10
  Indirect Costs 11
  Contracting or Transferring the Project Effort 11
  NSF Evaluation of Programs 11
  Notification of Final Action 11

VIII. Project and Award Management 12
  Grant Administration 12
  No-Cost Extensions 12
  Changes in Project Operation 12
  Publications 12
  Acknowledgement and Disclaimer 12
  Project Reporting Requirements 13
  Final Expenditure Information 13

IX. Appendices
  A. Cover Page for Preliminary Proposals 15
  B. Summary of Budget Estimates 16
  C. Cover Page for Formal Proposal 17
  D. Project Summary 18
  E. Summary Proposal Budget 20
  F. Final Project Report 22
  G. Check List for Proposal Submission 24
  H. Proposal Evaluation Report 25
  I. Evaluation Criteria 27

DEVELOPMENT IN SCIENCE EDUCATION

I. PURPOSE OF THE PROGRAM

The long-term goal of the Development in Science Education (DISE) Program is to increase the quality and diversity of science education in the United States. It provides funding needed to originate, develop and experiment with significantly new ideas having potential for substantially improving science education—education aimed at any level and designed for any group of people. DISE projects, in order to achieve generally applicable and broadly useful results, are distinguished by formal attention to a broad background of need, delineation of a novel opportunity for advance, means for objective evaluation of effect, and a plan for achieving appropriate dissemination of project results.

The objectives in any particular year may be more limited so as to focus resources on specific types of activity, populations or disciplinary areas selected for their national importance or timeliness. Five such areas are currently being emphasized:

A. Science for the Early Adolescent

B. Improving Access to Careers in Science For Women, Minorities and the Physically Handicapped

C. Science Literacy, and Science, Technology and Society

D. New Knowledge and New Skills—Education for Productivity

E. Technology for Science Education

Proposals directed at concerns other than these five may be submitted, but they will need to be of compellingly greater-than-ordinary interest or potential national value if they are to gain serious consideration.

A. Science for the Early Adolescent: The period of early adolescence (approximately the age span that middle schools and junior high schools address) is critical in the science education of students. This is often the last opportunity to reach these students, as many choose not to take science courses in senior high school. Thus, it is essential that science instruction be of the highest quality during this period, both for the sake of raising the level of scientific awareness in the general population, and for the retention in science of those who may later have an interest in scientific professions or other science-related careers.

Despite the importance of the period of early adolescence, it has received little emphasis in science education. Teacher education programs tend to be aimed at elementary or secondary levels, with neither specifically addressing the middle school or junior high school. The science curriculum too often fails to appear relevant to the daily life of the early adolescent, neither exciting their curiosity nor addressing their career planning concerns.

Since the scope of the problem is far greater than what the Foundation can attack directly, the development of models is sought. Such models should have the potential for adoption on a broad scale, and should be one of the following types:

1. Pre-service teacher education programs specifically designed to prepare junior high or middle school teachers. Such programs should be centered on the nature of the early adolescent learner and may encourage interdisciplinary instruction.
2. In-service science education programs for junior high and middle school teachers and, where good justification exists, for such other staff as administrators, counselors and aides. These models should represent cooperative school-university relationships where control is established to guarantee that specific, local problems will be addressed. Projects that transcend traditional disciplinary boundaries in the sciences are fully acceptable.
3. Techniques and prototype materials designed to increase the career relevance of science education for early adolescents. These should be supplementary techniques and materials of potential use with a number of basic curricula. Focus should be on science and science-related careers, and should not stress only those careers which require advanced degrees. (See also Sections A4 and B, below.)
4. Projects to provide opportunities for early adolescents to have first hand experiences with scientific phenomena and settings. Emphasis should be on reinforcing regular

instruction in a systematic and coordinated manner.

As the emphasis is on the development of generalizable models, each project should establish procedures for generating information about the model: What problems are likely to be met in attempting to install it in other locations? What will be the costs associated with its adoption or adaptation? Where the project does not wish to conduct this knowledge generation with internal evaluators, external experts may be employed as consultants or even sub-contractors.

One key purpose of any project in this program area should be to provide additional options in science for early adolescents; options that will both educate and excite. Adjunctive educational approaches for informal out-of-school settings may be especially effective with this age group.

B. Improving Access to Careers in Science for Women, Minorities and the Physically Handicapped: The professional cadre of scientists and engineers in this country continues, despite efforts at amelioration, to reflect inadequate participation of women, minorities and the physically handicapped. These imbalances run counter to the distribution of talent and thus represent a waste of scientific potential.

The DISE Program will consider projects that propose to develop and test materials, teaching approaches, structures or activities designed to overcome barriers to science careers and to retain in science course sequences a far greater proportion of these groups.

C. Science Literacy, and Science, Technology, and Society: Science and technology, their impact and their consequences, can be understood and evaluated only in the context of the larger society in which they exist and together with the other great intellectual and aesthetic activities of modern life. However, the connections between science and society are rarely the substance of education at any level—

> The science literacy of the citizenry is low, in part because the Nation's general education only poorly prepares most of the people to deal with the science-related social issues and value problems of the day;
>
> For the most part, the education of scientists and engineers fails to deal in any depth with the humanistic aspects of their work or to raise the difficult issue of the social responsibilities of science;
>
> The professional education of non-scientists is equally deficient in its neglect of science.

The DISE Program is interested in helping to develop and test learning materials and teaching approaches that address these problems. Proposals can address any aspect of the relationship of science, technology and human values—at any educational level. Where appropriate, the collaboration of colleges and pre-collegiate institutions, or of academic and industrial organizations, is encouraged. The following are examples of the kinds of projects that might be supported under this heading.

- The science education of persons preparing for careers in the non-science professions, such as law, business, public administration, and teaching.
- The integration of issues of ethics, values, and social responsibility into the professional education of scientists and engineers.
- The development of innovative curricula and materials at precollegiate levels that deal with the social role and consequences of science and technology. Plans will be considered for incorporating such instruction into formal education in social studies, history and other non-science courses, as well as those concentrating on the improvement of science courses along these lines.
- The encouragement at all educational levels of innovative courses and materials dealing with the interrelationships of science, the arts, and the humanities, to bring about the mutual enrichment of the great domains of learning.
- The enrichment of the science experience of children and adults through extra-curricular programs, such as science clubs and museum activities that supplement formal science education and enhance science literacy.

D. New Knowledge and New Skills—Education for Productivity: National productivity and economic progress depend on a society's ability to capitalize upon new technological opportunities. New scientific advances and new technologies such as microelectronics make older systems obsolete. The country that can develop trained people who can readily acquire new basic knowledge and can apply new techniques will be able to sustain the quality of life, both through economic strength and the design of new economic configurations such as are implied by the appropriate technology movement.

To help society respond to changing conditions, the educational system must be able to rapidly and widely disseminate the results of scientific research and invention. It is desirable to reduce the time lag between the discovery of new principles and practices and their appearance in relevant curricula and instructional materials. This applies both to the training of new applied scientists and engineers and to the continuing education of practicing professionals. Educational programs need to identify and provide new mixes of skills, career orientations, and presentation modes.

The DISE Program is open to proposals for improving the ability of our educational system to meet these needs through the infusion of the latest and most forward-looking science and technology into core courses. Such efforts are most likely to be needed at the upper division, graduate, and continuing education levels. They may address either the needs of those who will teach scientists and engineers, or those who will apply their improved knowledge directly. Academic-industrial or user collaboration is encouraged.

Project scope and potential impact should address the *general* problems faced in trying to make the educational system responsive to new knowledge and techniques in the area of concern. Content should reflect the latest scientific knowledge and be illustrated by new processes that make major differences. Since technology transfer depends upon people who will continually seek out and apply new principles and practices as they emerge, proposed projects should promote a lifelong problem-solving orientation.

Proposers should be aware that only a small number of pilot efforts of particular inventiveness in dealing with the problems of injecting new knowledge into the educational system are likely to be supported. Key areas of concern include education for applying science and appropriate technology to energy, environment, and economic productivity.

E. Technology for Science Education: Recent technological achievements offer increased opportunities for improved learning at all levels. The power and diversity of computers and other electronic technology have already been demonstrated widely, but the implications of their ever decreasing cost and of such recent introductions as microprocessors continue to invite educational exploitation.

Therefore, the DISE Program will consider the support of experimental projects designed to employ novel applications of technology to improve science education at any level. As with the other DISE topics discussed above, specific attention should be given to such considerations as improving cost-benefits, creating and testing new instructional materials or techniques, achieving greater subject matter mastery per unit of student/teacher effort, fostering constructive student responses and attitudes, advancing other generally recognized educational goals—and making the project's outcomes widely available. Results that are applicable across academic departmental (disciplinary) lines will be especially welcome.

Continuing Education: While the continuing education of non-academically employed scientists and engineers is not a separate DISE focal area, proposals relating to this topic are encouraged. Such proposals should be directed to one of the relevant focal areas described above. The following are examples of supportable activities:

> Technology for Science Education. The employment of novel applications of technology to improve continuing education science courses.
>
> New Knowledge and New Skills—Education for Productivity. Infusion of the latest and most forward-looking science and technology into the continuing education courses of non-academically employed scientists or engineers in order to increase productivity. (Academic-industrial collaboration is strongly encouraged.)
>
> Improving Access to Careers in Science for Women, Minorities and the Physically Handicapped. Development and testing of new approaches and/or materials which retain in continuing education science courses greater proportions of women, minorities and physically handicapped groups.
>
> Science, Technology and Society. Development and testing of novel instructional approaches and/or materials which integrate the issues of ethics, values and social responsibility into the continuing education of non-academically employed scientists or engineers.

II. ELIGIBILITY CONSIDERATIONS

A. Eligible Disciplines

Projects that deal with the physical, biological, or social sciences, engineering, mathematics, technology, or combinations of these disciplines will be entertained. However, the practice aspects of technical, clinical, health, social and business fields are excluded. (Examples of areas that will not be considered by the DISE Program are medicine, nursing, clinical psychology, social work, business administration, the arts, and the humanities.)

B. Eligible Institutions

Faculty of U.S. universities and colleges prepare most proposals, which are submitted by their institutions. Graduate students are not encouraged to prepare proposals. Normally, they should apply for fellowship support or arrange to serve as assistants to faculty members.

Proposals are invited also from other U.S. institutions, such as professional, scientific, and educational associations or societies; independent museums; research institutions and laboratories; and state educational agencies.

Other types of institutions, such as individual schools, school districts, private profit organizations, Federal agencies and foreign institutions, and unaffiliated individuals may participate in projects by associating themselves with any of the above organizations and are encouraged to do so. For-profit organizations may submit proposals directly in continuing education only.

C. Eligible Projects

Activities supported by DISE include:

- Development, testing and evaluation of new instructional materials.
- Design, testing and evaluation of innovative instructional delivery modes both in formal school settings, and in out-of-school situations.
- Identification of technologies that promise enhanced effectiveness of science education; experimentation with and improvement of these technologies.

Assistance will be aimed at developing new methods (having tested utility and reasonable cost) for adapting science education to current circumstances. Where the context permits, DISE projects should be designed to produce both a useful new instructional resource and also such advances in our knowledge of the teaching/learning situation as can be achieved without diffusing the project's principal focus. Specific provisions should be designed into each project to promote dissemination of project results to prospective users. Thus, the activities must show promise of providing new, practical and economical outcomes that would be useful beyond the immediate confines of the development activities—i.e., they must not be site-specific. *Local* implementation or adaptation of already-developed models cannot be funded under this program.

The activities must not be more appropriately the concern of other public agencies or of the private sector. Each project must exhibit a clear and strong association with science education in conformity to NSF's operational definition of science cited above. Clinical sciences and the humanities are supported through the Department of Health, Education and Welfare, and through the National Endowment for the Humanities. NSF support is available only for development projects that are, for valid and adducible reasons, not likely to attract support from business or private foundations.

It is generally true that formal proposals will be strengthened by a systematic consideration of the theoretical foundations and the relevant literature upon which the project is based. Purely intuitional approaches will be downgraded if reviewers find that relevant findings of other workers or concurrent efforts with which an investigator should be familiar have been neglected.

No single award will cover a time period of more than three years, although projects of longer duration are possible if sequential awards are shown to be justified. Proposers with new ideas are encouraged to start with a small, exploratory plan and then, if the results are encouraging, to come back later for support of more extensive development efforts.*

Where support for only the early phase(s) of an extended project is being requested, the narrative should

(a) briefly outline the scope of the entire project and estimate its ultimate costs in terms of manpower and finances;

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*We recognize that there may be situations where this is not practical, but generally DISE expects to make a fair number of smaller phased grants rather than a few larger ones.

(b) concentrate upon the activities for which support is initially requested; and

(c) show how, even if no support beyond the initial phase were to be awarded, demonstrable gains would be made. Initial phases should be limited in scope, but should be designed to reach a significant benchmark. Phases do not have to be even increments of years.

D. Other Important Factors

Proposals are to demonstrate that need has been clearly and objectively established, and that there are good reasons for believing that others (preferably many others) are likely to benefit from the project's outcome.

Projects intended to introduce economies to the educational system will start with a competitive advantage. Cost-effectiveness—the same quality at less cost or greater quality at equal cost—is a crucial concern. If a project's results promise to be substantially more expensive than whatever they replace, the project is less likely to be supported than would be true otherwise.

Dissemination of development project findings and products should not be left merely to chance. The end products should lend themselves to documentation or to an evaluation that could provide non-partisan information about the results. Project budgets may include support for bringing the project's results to the attention of others who face similar problems or opportunities. Proposals are expected to contain substantial evidence that the project is being planned from its very beginning with a view toward maximizing its eventual impact upon the intended target group in places other than the one in which it is developed.

The project must include elements that are experimental, innovative, unusual, or significantly different from what has been done elsewhere. New knowledge should be generated. A premium will be placed upon what peers regard as good ideas.

In addition, proposals will be judged on such factors as:

- qualifications of personnel;
- quality of institutional commitment and resources;
- appropriateness of project design;
- suitability of the evaluation plan; and
- reasonableness of the budget.

See Section VI, Proposal Evaluation, and Appendix I for review criteria to be used in judging formal proposals.

III. PREPARATION OF PRELIMINARY PROPOSALS

In the DISE program, preliminary proposals are required that sketch in broad strokes the essential features of the project—its purpose, the design procedures, the evaluation plan (if appropriate), the plan for achieving maximal impact upon potential audiences in other places, the key personnel and their duties, and estimates of costs and project duration. Such a preliminary proposal enables the staff to determine whether the proposed project has relevance to the Foundation's goals. A preliminary proposal is treated as an informal document involving no commitment on the part of either the applying organization or the Foundation.

Preliminary proposals will be reviewed by Foundation staff and, where appropriate, by individuals outside the Foundation who are competent in the areas covered in the proposals. However, the proposal should be written in a way that makes its scientific contribution clear to all reviewers, including those whose own research may be in different areas.

Each preliminary proposal should consist of the following elements:

1. A cover page in the format shown in Appendix A.
2. A narrative of no more than eight double-spaced typewritten pages providing a rationale for the activity, a description of the resources, a procedural plan, and a description of the anticipated results or product. Reviewers seek evidence of a significant problem, the essential conceptual and methodological features of a proposed approach to its solution, a listing of the personnel to be involved and the qualifications that particularly suit them for the project.
3. An estimated budget in the format shown in Appendix B.

No signatures of institutional representatives are required at this stage by the Foundation. The preliminary proposal will be reviewed by Foundation staff and, where necessary, by outside judges. Reviewers will evaluate the proposed project's responsiveness to these Guidelines and its merit as measured against the "Other Important Factors" discussed in Section II,D.

Six copies of the preliminary proposal and two spare copies of the cover page, securely wrapped into a single package, should be sent to:

Development in Science Foundation
SEDR/W-630
National Science Foundation
Washington, D.C. 20550

N.B. *Preliminary* proposals should *not* be sent to NSF's Central Processing Section.

The Foundation's response to a preliminary proposal will indicate whether or not, in the view of the staff, the proposer should be encouraged to prepare and submit a formal proposal. Even if a formal submission is discouraged, applicants are free to enter the formal competition if in their judgment, their peers are more likely to respond favorably to their formal proposal than preliminary reaction indicated. Such proposals will be reviewed without prejudice.

Schedule

There are no fixed deadlines for the submission of preliminary proposals (but see box inside front cover). Investigators who would like to discuss preliminary proposals with the staff may do so by telephone or in person. Although visitors are welcome, time is usually better used if information is provided to the NSF program office about a proposed project before a prospective applicant makes a visit. The NSF program office is located in Room 621, 5225 Wisconsin Avenue NW, Washington, D.C. Please do not use this for a mailing address; send mail to the address given in III. above. Telephone calls may be placed to the staff at 202/282-7904. Regular hours are 8:30 a.m. to 5:00 p.m. Monday through Friday.

IV. PREPARATION OF FORMAL PROPOSALS

Formal proposals are expected to follow preliminary proposals for those applicants who choose to proceed to this stage. Formal proposals generally require at least five months after receipt by NSF before a final decision is reached. These time periods should be kept in mind when planning a projected starting date.

INTENT TO SUBMIT CARD

To facilitate our preparations for the review process, proposers are requested to complete and submit the Intent to Submit Card (back cover of this brochure) as soon as they have decided to submit a formal proposal.

PROPOSAL FORMAT

Formal proposals should contain the following elements, presented in the order indicated:

Cover Page
Project Summary
Budget Summary
Budget Explanation
Narrative
Other Commitments of Senior Personnel
Appendices
(See Appendix G for checklist)

COVER PAGE (SEE APPENDIX C)

The cover page must be prepared in the format prescribed in Appendix C. One copy must bear the two required signatures.

PROJECT SUMMARY (SEE APPENDIX D)

The summary is to be a clear and simple precis that accurately describes the proposed project. Employ a minimum of technical terminology and write so that a scientifically literate person can understand the use of Federal funds requested to support the project. State the objectives of the proposed project and the basic elements of the development plan. Provide as much detail as is possible within the space limitations of the form. Type this form single spaced (this is an exception to the general rule calling for double-spacing throughout the proposal).

BUDGET MATTERS (APPENDIX E)

The Foundation requires a Summary Proposal Budget prepared in accordance with Appendix E. Sufficient travel funds should be included in proposal budgets to allow two visits of the Principal Investigator (and principal assistants if needed) to Washington, D. C., for Foundation-sponsored meetings.

In a separate "Budget Explanation" section, components of each major item in the budget should be identified and justified. The explanation should briefly state why an item is important and *how the projected cost was estimated.* Reviewers must be enabled to clearly and specifically relate each budget item to the activity it supports. The numbers of graduate students and post-doctoral fellows supported by the project and the fractional time they are employed should be specified in the budget explanation. It should be noted that the DISE program does not support extensive equipment acquisitions except in very unusual circumstances.

NARRATIVE

The narrative must not exceed 30 double-spaced pages. Whenever concise wording, graphical presentation and other techniques would shorten the proposal, they should be employed. The narrative should include:

1. *Topic.* Provide a statement and description of the topic addressed, and a clear specification of the development activities to be undertaken. Proposers are to present a case for the projected work in light of the DISE objective as stated in the Introductory Section of this brochure. Evidence of need or utility, where possible citing objective and independent sources, should be presented. Include critical literature references and cite important and relevant past work.

2. *Significance and need.* Discuss why results or products of the proposed work can be expected to lead to widespread adoption of significantly better practices in science education and/or to identify the need for and to guide further research. Explain why existing agents for educational change do not afford a promising source of support for the work envisioned—i.e., what is the basis for believing that Federal (specifically, NSF) support is needed for this project?

3. *Procedure.* Describe the procedures to be followed in carrying out the project, and state why they were selected. Describe also the procedures to be used in evaluating the product as it is being developed. How will information obtained here be

used to guide the project and to improve the final product?

Discuss what objective information on the educational effectiveness, replication costs, etc., of the product will be made available to potential users, and how. Describe adequate and appropriate plans for disseminating information on the products/outcomes of the project to the user community. If the products include instructional materials, include a discussion of the mechanisms which are planned for distributing the material to users—both during the period when trial versions are being tested, and after final versions are available.

4. *Personnel Qualifications.* Briefly describe the education and experience of the principal investigator and other key staff and relate these qualifications to the proposed project activities. It is expected that the principal investigator will be the individual who was primarily responsible for the proposal's conception and preparation, and that he or she will be directly and extensively involved in the project. Indicate how the skill mix of project staff fits anticipated project needs. Include the vitae of all principal professional personnel in an appendix.

Eligible persons who have never received an NSF grant, or who have earned a doctoral or other degree within the last five years, may apply as new or young investigators. Check the appropriate block on the cover page if you wish to be considered as a new or young investigator. The Foundation favors the recruitment of additional talent into the cadre of professionals concerned with improving the Nation's educational systems and where possible will support the work of performers new to this field.

5. *Organization and Management Plan.* Specify the proposed structure for operating the project and the responsibilities of key personnel. This section must include a carefully thought out schedule of activities which identifies the project starting date, termination date and other significant progress points. Use milestone charts and other graphic or verbal presentations to clarify the development process and timetable.

OTHER COMMITMENTS OF SENIOR PERSONNEL

Each proposal must list all current projects, in addition to the proposed project, to which senior personnel have committed a portion of their time (whether or not salary for the person involved is included in the budgets of the various projects). This information should include the titles and dates of current grants or contracts, the source of funds, annual budget levels, and the person-months devoted to each project by each of the senior personnel. The proposal must also provide analogous information for all other proposed projects which are being considered by, or which will be submitted in the near future to, other possible sponsors including other NSF programs. Concurrent submission of a proposal to other organizations will not prejudice its review by the Foundation.

No consultant shall be reimbursed as a direct cost under this award at a rate which exceeds $183. per day. Further, the consultant ceiling requirement is intended to apply to subcontracts.

APPENDICES

Appendices should be used in the manner prescribed. In addition, they may be used sparingly to provide background or supporting information. It should be kept in mind, however, that reviewers' time is limited, so voluminous appendices may not be studied carefully.

V. SUBMISSION OF FORMAL PROPOSALS*

1. Twelve (12) copies of the complete proposal are required.
2. Copy must be typed double-spaced on one side only of 8 1/2" x 11" paper. Typescript must be contained within a space 8" x 10 1/2".
3. Pages are to be numbered at the bottom.
4. Proposal copies are to be assembled in the order shown above, and stapled in the upper left hand corner, but not otherwise bound.
5. The original signed Cover Page is the only letter of transmittal needed or desired. Institutional letters of endorsement or transmittal, supporting letters, institutional forms, etc., if included, must be appended to the back of the proposal.
6. Proposals must be securely bound in a single package and either mailed to:

   Central Processing Section
   National Science Foundation
   Washington, D. C. 20550
   ATTN: Development in Science Education (DISE)

   or hand-delivered to Room 223, NSF, 1800 G Street, N.W., Washington, D.C.

7. To facilitate prompt acknowledgement of the arrival of the package at the Foundation, the proposer should cut out two acknowledgement-of-receipt postcards from the back cover of this guide, address one card to the principal investigator and the other to the official authorized to sign the Cover Page. Attach both to the Signature Copy of the Cover Page. When the package arrives, the date of receipt and an assigned proposal number will be stamped on the card before it is returned, so that thereafter the proposer and the Foundation may refer to this proposal number in correspondence. If receipt is not acknowledged within 2 weeks of submission, the program office should be contacted promptly at 202/282-7904.

VI. PROPOSAL EVALUATION

METHOD OF SELECTION

Proposals will be reviewed by the National Science Foundation staff assisted by persons in the appropriate science and science education communities, in professional groups, and in relevant Federal agencies. When appropriate, individuals representing the interested public may be included as reviewers. Sole responsibility for the final decision on each proposal rests with the National Science Foundation. From within its areas of emphasis the Foundation will select for award those proposals which, in its judgment, offer the greatest potential for improving science education. In many cases, negotiation between the Foundation and the proposer will be conducted. In cases of substantially equal merit, consideration may be given also to such factors as program balance, young or new investigators, institutional diversity, geography, and appropriate demographic variables.

EVALUATION CRITERIA

Formal proposals are evaluated according to the quality, merit and significance of the projected results and of the design of activities to achieve those results. Reviewers will examine proposals and submit comments based on the criteria which are presented in Appendix I (q.v.).

REVIEWS

Reviewers will be provided with a copy of the proposal, these Guidelines, the Guide for Submission of Preliminary Proposals, and an evaluation form. They will be asked to address each of the above criteria individually. A copy of the evaluation form is in Appendix H.

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*See Check List for Proposal Submission in Appendix G.

VII. OTHER CONSIDERATIONS

ASSURANCE OF COMPLIANCE WITH CIVIL RIGHTS ACT

If the applicant institution has not filed an Assurance of Compliance with Title VI of the Civil Rights Act of 1964 as required by NSF regulations, pertinent forms and a copy of the regulations may be obtained by writing to the Foundation's Division of Grants and Contracts. The required Assurance Form, when completed by the institution, should be submitted to the Division of Grants and Contracts. Once an Assurance Form has been submitted by the applicant organization, it covers all proposals subsequently submitted by any department or other unit of that organization. Individual Assurance Forms are not necessary for each application or for each approval. If there is some question as to whether an institution has filed an Assurance of Compliance, the institution's business office should be consulted.

GRANTEE ORGANIZATION AND MANAGEMENT DATA

If your organization has not received an NSF grant within the past 2 years, please fill out the Organization and Management Information card on the back of the brochure and mail it to the address indicated on the card.

HUMAN SUBJECTS

a. The protection of the rights and welfare of human subjects (including students) involved in research, development and related activities supported by NSF grants is the responsibility of the grantee.

b. The informed consent of the individual is a vital element in the protection of human subjects. Applicants are referred for guidance to CODE OF FEDERAL REGULATIONS, Title 45, Part 46, Protection of Human Subjects, Revised as of April 1, 1977, available from the Office for the Protection from Research Risks, National Institutes of Health.

c. Before a grant can be made, NSF must receive a certification that research involving use of human subjects has been reviewed and approved by the appropriate Institutional Review Board at the grantee organization, and that the grantee assures NSF that it will comply with DHEW policies, as amended, regarding the use of human subjects. This statement must be received prior to the final processing of an award.

PRE-COLLEGE STUDENTS AND EXPERIMENTAL CURRICULUM DEVELOPMENT PROJECTS

Grantees of projects which involve pre-college students in research or development on, or the pilot-testing, evaluation, or revision of, experimental or innovative curriculum development projects will:

a. Provide to the school board, or comparable authority responsible for the schools considering participation in the project, information concerning the need for and purposes of the particular education project, the proposed content of the material to be used, the expected benefits to be derived, and other information to assist the jurisdiction in arriving at a decision on participation.

b. Obtain, after the responsible authority has carried out its procedures, written approval for participation in the project activities.

c. Provide information and materials to the responsible school authority to assist it in carrying out its own established procedures regarding the participation of students in project activities.

d. Provide information to the Foundation describing compliance with the above provisions.

e. Provide, in accord with NSF FY 1976 House Authorization Legislation (Public Law 94-86), in every publication, testing or distribution agreement involving instructional material developed under a grant (including but not limited to teacher's manuals, textbooks, films, tapes or other supplementary material) that such material will be made available within the school district using such material for inspection by parents or guardians of children engaged in educational programs or projects of that school district.

ACCESS TO PEER REVIEW INFORMATION

After final decisions have been announced, the Foundation will provide the reasons for its decision on a proposal to the principal investigator only. Verbatim copies of reviews, not including the identify of the reviewer, will be made available.

PRIVILEGED INFORMATION

Proposals resulting in awards are are an integral part of an awarded grant or contract. Such proposals, will be made available to the public upon specific request. A proposal that does not result in an award may be retained by the Foundation. Such a proposal will be released only: (1) with the consent of the proposer; or (2) to the extent required by law. A proposal may be withdrawn at any time prior to final action thereon by the Foundation.

Information or materials which the Foundation and the awardee mutually agree to be of a privileged nature will be held in confidence to the extent permitted by law, including the "Freedom of Information Act"(Public Information Act of 1966 as amended 5 U.S.C. 552). Proprietary scientific information, salaries of key personnel, or other information which the grantee desires be treated in confidence should be included in a separate statement bearing a legend similar to the following: "Following is (Proprietary) (specify) information which (name of proposing organization) requests not be released to persons outside the Government, except for evaluation purposes." Without assuming any liability for inadvertent disclosure, NSF will seek to limit dissemination of such information to its employees and, where necessary for evaluation of the proposal, to outside reviewers. In any case, NSF will not be limited in using similar information obtained without restriction from another source.

INDIRECT COSTS

Each proposal may include indirect costs at the rate approved for the institution. Proposals should specify the institution's approved rate and, if different, the rate requested for the proposed activities. The approved rate and the base for the computation may be obtained from the business officer of the institution. That person should contact the Foundation's Division of Grants and Contracts, Cost Analysis Section, Award Accountability Branch if the organization does not have an approved rate; e.g., is a first-time applicant. If information is needed with regard to an approved rate, call 202/634-7545.

CONTRACTING OR TRANSFERRING THE PROJECT EFFORT

Excluding the purchase of commercially available supplies, materials, equipment, or general support services allowable under the grant, none of the research or substantive effort under an NSF grant may be contracted or otherwise transferred to another organization without prior NSF approval. Normally, the intent to so contract is to be fully disclosed in the proposal submission, and evidence of NSF prior approval appears in the grant instrument. In the event that the need to so contract arises after a grant has been made, the grantee must submit to the NSF Grants Officer the proposed performance statement and budget, a statement indicating the basis for selection of the contractor, and a justification of the proposed arrangement. The request must be signed by the Project Director and endorsed by the Authorized Organizational Representative. NSF approval will be indicated by letter from the Grants Officer.

NSF EVALUATION OF PROGRAMS

Proposers should be aware that the Foundation may, as part of its own program evaluation activities, carry out in-depth evaluations of selected awarded projects through independent third parties. Thus, proposers should be prepared to cooperate with any evaluators eventually retained by the Foundation to analyze both the institutional context and the impact of any supported project.

NOTIFICATION OF FINAL ACTION

Notification of awards is made in writing by the Foundation's Grant Officer. Organizations whose proposals are unsuccessful will be advised as promptly as possible by the NSF Division administering this solicitation or program announcement.

VIII. PROJECT AND AWARD MANAGEMENT

GRANT ADMINISTRATION

Grants will be administered in accordance with the terms and conditions of the award instrument.

An NSF grant is normally made to an organization, known as the grantee, rather than to the individual principal investigator who proposed to conduct the project. Notification of an award is made by letter signed by the NSF Grants Officer. The grant establishes a relationship between NSF and the grantee in which:

a. NSF agrees to provide financial support for the project to be performed under the provisions of the grant instrument.

b. The grantee agrees to the performance of the project, to the prudent management of the funds provided by the grant, and to the provisions of the grant instrument.

The grantee is free to accept or to reject the grant. Normally, the action to obtain Federal funds constitutes acceptance of a grant once it is made. However, in some cases, NSF may require written acceptance.

All written inquiries of a programmatic or technical nature should be directed to the Development in Science Education Program, National Science Foundation, Washington, D.C. 20550. Inquiries about other matters should be directed to the Foundation's Division of Grants and Contracts at the same address.

Personal visits to the program staff may be made to Room W-628, 5225 Wisconsin Avenue, N.W., Washington, D.C. or telephone calls directed to 202/282-7904. (Correspondence should not be sent to the Wisconsin Avenue address.)

Incorporated into the grant letter is the approved budget and other grant conditions. The grant provides authority to the grantee to commit funds for support of the project at any time between the effective date of the grant and the expiration date of the grant.

The grant period extends from the effective date of the award through the expiration date. It is that span of time during which the objectives of the project are to be achieved and the grant funds are available for appropriate obligation. This period intentionally is longer than the duration of the project in order to allow time for preparation of reports after the project is concluded. The grant becomes effective on the date specified in the grant letter and expires on the date given in that letter. It is required that all commitments of grant funds be made during the grant period.

NO-COST EXTENSIONS

It is expected that projects will be completed within the time period specified in the award instrument. Therefore requests for no-cost extensions should be submitted only under the most unusual circumstances.

When the work is delayed, a no-cost extension may be requested. This request, along with a justification, must be received at the Foundation at least 45 days before the award expiration date, contain the signatures of both the Project Director and the Authorized Institutional Representative, and include a summary of progress, a budget for use of the remaining funds, plans to complete the project, and an updated statement of Other Commitments of Senior Personnel.

CHANGES IN PROJECT OPERATION

Although major changes in the conduct of the project may be proposed at any time, changes in the scope, objectives, and professional personnel of the project must be approved in advance by the Foundation. Requests should be addressed to the Program Manager responsible for monitoring the project.

PUBLICATIONS

The Foundation provides grant and contract support for education development and research in the sciences. The grantee or contractor is wholly responsible for the conduct of such research and development activities, publication of the results therefrom, and the preparation of curricular materials. The Foundation, therefore, does not assume responsibility for such findings, nor their interpretation, nor for the content of such curricular materials. Nevertheless, the Foundation retains the right to approve, in advance, the method of and plan for the distribution of such materials. For further information, request NSF Circular 123.

ACKNOWLEDGMENT AND DISCLAIMER

An acknowledgment of NSF support must be made in connection with the publication of any material based on or developed under a project supported by NSF to the effect that: "This (material) was prepared with the support of National Science Foundation Grant No. 00."

Any materials, books, monographs, proceedings of symposia, or similar publications supported by an NSF grant must contain a statement, immediately following the acknowledgment, that contains an expression of the following: "Any opinions, findings, conclusions or recommendations expressed (herein) are those of the author(s) and do not necessarily reflect the views of the National Science Foundation."

Project Reporting Requirements

Interim Reports. For grants having a duration of more than 1 year, interim reports should be submitted by the project director to the DISE Program staff at the end of each academic year's activities or at such other time as the Program may designate, covering such matters as (1) progress to date in comparison with the project schedule; (2) results to date of the on-going monitoring evaluation process; (3) problems encountered and methods used in solving them; and (4) circumstances or considerations which might significantly affect subsequent phases of the project.

Interim reports should *not* include requests for NSF approval for major changes. Such requests should in all cases be the subject of separate correspondence.

Final Project Reports. (See Appendix F—Form 98A, Parts I and II.) The Foundation's grant reporting procedures are as follows: Two copies of the Final Project Report (NSF Form 98A) are to be submitted by the Project Director within 90 days after expiration of the award to:

National Science Foundation
Division of Grants and Contracts
Post-Award Projects Branch
Washington, D. C. 20550

The purpose of a Final Report is two-fold. It provides a factual account of the project for the record, and it also provides an opportunity for assessing both the effectiveness of the activity and of the NSF program through which the project was supported. The grantee should bear in mind that the Final Project Report may be used, together with the project abstract prepared at the time of the award, to answer inquiries by non-scientists as to the nature and significance of projects which the Foundation supports. The report should be written in such a way that its scientific contribution will be clear to readers whose work may be in different areas.

Final Technical Description of Project and Results (Form 98A, Part III). In addition to the Final Project Report (NSF Form 98A, Parts I and II), a minimum of two copies of the Final Technical Report is required (Form 98A, Part IIIe). While there is no standard form for the Technical Report, it should contain a one-page summary or abstract, an index, and a narrative account of the project—its rationale, methods, and results obtained. The technical information, Part III of Form 98A, should be submitted directly to the DISE Program Manager within 90 days after the expiration of the award. It should be typed on standard size (8" x 10½" or 8½" x 11") paper, unbound, but stapled in the upper left hand corner, and bear the identification number of the grant.

Substantive Technical Reports that describe research results, knowledge, or information of general utility and interest, but that will not appear in the periodical literature or be published by professional, commercial or other organizations, should be submitted to both the National Technical Information Service (NTIS) and the Educational Resources Information Center (ERIC).

All Technical Reports submitted to NTIS should contain a completed ANSI Report Documentation Page (NTIS Form 35) and should be accompanied by one or more Accession Notice Cards addressed to the NSF Program Manager monitoring your project so that the program will have confirmation that the report was submitted. The NTIS Acquisition Number Technical Reports should be sent to:

Input Branch
National Technical Information Service
(NTIS)
U. S. Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

In order to submit reports to ERIC, two copies should be sent to:

Educational Resources Information Center
(ERIC)
Processing and Reference Facility
4833 Rugby Avenue
Suite 303
Bethesda, Maryland 20014

FINAL EXPENDITURE INFORMATION

Final expenditure information, also required for each completed grant, is provided through the quarterly Federal Cash Transactions Report (FCTR, formerly known as the Quarterly Expenditures

Report). The Foundation's computerized version of FCTR is forwarded to the fiscal officer of each grantee institution by the Foundation's Division of Financial and Administrative Management (DFA) in the month following the close of each calendar quarter. Procedures for reporting are sent to grantees at the time an award is made. Completed Federal Cash Transactions Reports are returned to:

Division of Financial and Administrative
Management
National Science Foundation
Washington, D. C. 20550

APPENDIX A

PRELIMINARY PROPOSAL
DIRECTORATE FOR SCIENCE EDUCATION
Cover Page

FOR CONSIDERATION BY NSF ORGANIZATIONAL UNIT **DEVELOPMENT IN SCIENCE EDUCATION**	PROGRAM ANNOUNCEMENT NUMBER: SE 80-50 PROPOSAL NUMBER: D________ (to be assigned by NSF)

NAME OF SUBMITTING ORGANIZATION TO WHICH AWARD SHOULD BE MADE (Include branch/campus/other components)

ADDRESS OF ORGANIZATION (Include Zip Code)

TITLE OF PROPOSED PROJECT (10 Word Limit)

	A. Phase for which support currently is requested	B. Likely future phase(s)	C. Total (A&B)
ESTIMATED COST TO NSF	$________________	$________________	$________________
ESTIMATED DURATION	________________ months	________________ months	________________ months

PRINCIPAL INVESTIGATOR'S NAME AND SOCIAL SECURITY NO* (Dr., Prof., Mr., Mrs.) (Name only one person)	PI/PD PHONE NO. Area Code: OFFICE: HOME:
PI DEPARTMENT	PI ORGANIZATION
DISCIPLINE	STARTING DATE

CHECK ALL APPROPRIATE BOXES

FOR NSF PROGRAM USE ONLY

- ☐ A. Science for the Early Adolescent
- ☐ B. Improving Access to Careers in Science
  - ☐ Minorities
  - ☐ Physically Handicapped
  - ☐ Women
  - ☐ Other ________________
- ☐ C. Science, Technology and Society
- ☐ D. New Knowledge and New Skills — Education for Productivity
- ☐ E. Technology for Science Education
- ☐ F. Other

☐ Informal Education Component
☐ Continuing Education Component

☐ Major Research Component
☐ P.I. New to Science Education Development

TARGET POPULATION (Check all that apply)

☐ Pre-school ☐ Grades K-4 ☐ Grades 5-8 ☐ Grades 9-12 ☐ Undergraduates ☐ Graduates ☐ Other

*Submission of social security numbers is voluntary and will not affect the organizations eligibility for an award. However, they are an integral part of the NSF information system and assist in processing the proposal. SSN solicited under NSF Act of 1950, as amended.

Abstract:

PI Signature	Date

APPENDIX B

(FORMAT for Preliminary Proposals, DISE)
SUMMARY OF BUDGET ESTIMATES

	INITIAL PHASE (Current Request)	Total of all (present and projected future) phases
Salaries, wages & fringe benefits	$ ____________	$ ____________
Equipment	____________	____________
Materials & Supplies	____________	____________
Travel	____________	____________
Publication costs	____________	____________
Computer services	____________	____________
Consultant services	____________	____________
Other direct costs (itemize by category)		
____________	____________	____________
____________	____________	____________
____________	____________	____________
____________	____________	____________
Indirect costs		
Current institutional rate is _____%		
of ____________	____________	____________
TOTAL, direct & indirect costs	$ ____________	$ ____________

APPENDIX C FORMAL PROPOSAL

PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

DIRECTORATE FOR SCIENCE EDUCATION

Cover Page

FOR CONSIDERATION BY NSF ORGANIZATIONAL UNIT

DEVELOPMENT IN SCIENCE EDUCATION

IS THIS PROPOSAL BEING SUBMITTED ELSEWHERE IN NSF OR TO ANOTHER FEDERAL AGENCY?

Yes _________ No _________

IF YES, EXPLAIN ON ATTACHED SHEET.

PROGRAM ANNOUNCEMENT/SOLICITATION NO.:
SE 80-50

CLOSING DATE: NONE

NAME OF SUBMITTING ORGANIZATION TO WHICH AWARD SHOULD BE MADE (Include branch/campus/other components)

ADDRESS OF ORGANIZATION (Include Zip Code)

TITLE OF PROPOSED PROJECT (10 Word Limit)

TOTAL REQUESTED FROM NSF:

$

PERIOD OF PROJECT OPERATION:

Starting Date:

Duration in months:

PRINCIPAL INVESTIGATOR'S NAME AND SOCIAL SECURITY NO.* (Dr., Prof., Mr., Ms.)
(Name only one person)

PI PHONE NO. Area Code:
OFFICE:
HOME:

PI/PD DEPARTMENT

DISCIPLINE

PI ORGANIZATION

	A. Phase for which support currently is requested	B. Likely future phase(s)	C. Total (A&B)
ESTIMATED COST TO NSF	$________________	$________________	$________________
ESTIMATED DURATION	____________ months	____________ months	____________ months

NUMBER OF THE PRELIMINARY PROPOSAL WHICH PRECEDED THIS FORMAL PROPOSAL: D______________________

CHECK ALL APPROPRIATE BOXES

- ☐ A. Science for the Early Adolescent
- ☐ B. Improving Access to Careers in Science
  - ☐ Minorities
  - ☐ Physically Handicapped
  - ☐ Women
  - ☐ Other ______________
- ☐ C. Science, Technology and Society
- ☐ D. New Knowledge and New Skills — Education for Productivity
- ☐ E. Technology for Science Education
- ☐ F. Other

FOR NSF PROGRAM USE ONLY

- ☐ Informal Education Component
- ☐ Continuing Education Component

- ☐ Major Research Component
- ☐ PI new to Science Education Development

TARGET POPULATION (Check all that apply)

☐ Pre-school ☐ Grades K-4 ☐ Grades 5-8 ☐ Grades 9-12 ☐ Undergraduates ☐ Graduates ☐ Other

***Submission of social security numbers is voluntary and will not affect the organization's elibigility for an award. However, they are an integral part of the NSF information system and assist in processing the proposal. SSN solicited under NSF Act of 1950, as amended.**

PRINCIPAL INVESTIGATOR	AUTHORIZED ORGANIZATIONAL REP.	OTHER ENDORSEMENT (optional)
NAME (Dr., Prof., Mr., Ms.)	NAME (Dr., Prof., Mr., Ms.)	NAME (Dr., Prof., Mr., Ms.)
SIGNATURE	SIGNATURE	SIGNATURE
TITLE	TITLE	TITLE
DATE	DATE	DATE

APPENDIX D

NOTICE OF RESEARCH PROJECT

SCIENCE INFORMATION EXCHANGE

SMITHSONIAN INSTITUTION

NATIONAL SCIENCE FOUNDATION

PROJECT SUMMARY

PROJECT NO. (Do not use this space)
NSF AWARD NO.

1. NAME OF INSTITUTION (INCLUDE BRANCH/CAMPUS & SCHOOL OR DIVISION)

2. MAILING ADDRESS

3. PRINCIPAL INVESTIGATOR AND FIELD OF SCIENCE/SPECIALTY

4. TITLE OF PROJECT

5. SUMMARY OF PROPOSED WORK (LIMIT TO 22 PICA OR 18 ELITE TYPEWRITTEN LINES)

FOR NSF USE ONLY

DIVISION (OFFICE) AND DIRECTORATE	PROGRAM	
SECTION	PROPOSAL NO.	F.Y.

FOR DGC USE ONLY

START AND END DATES	AMOUNT GRANTED

NSF FORM 4 (7-78)

1. Proposal Folder
2. Program Suspense
3. Division of Grants & Contracts
4. Science Information Exchange
5. Principal Investigator
6. Off. of Govt. & Pub. Progs.
7. Assistant Director

Directions and Codes for Completion of Lines 4 and 5 on Project Summary Form

N.B. THE FOLLOWING DESIGNATIONS SERVE TO ASSIST THE FOUNDATION IN ASSIGNING REVIEWERS AND OBTAINING GENERAL DATA.

Major Discipline Classification: Please classify the proposal according to the following major group(s). The appropriate code should appear on line 4 of the Project Summary Form.

BZ	(Biology): subjects in category of "Life Sciences"
CH	(Chemistry)
CS	(Computer Science)
EN	(Engineering)
EZ	(Earth Sciences)
IN	(inter- and Multidisciplinary Sciences)
MA	(Mathematics): other than Computer Science
PS	(Psychology)
PY	(Physics): includes Physical Sciences
SZ	(Social Sciences): subjects in category of "Social Science"
ZZ	(Other Sciences)

Field of Science and Engineering Codes: Please identify the specific subject(s) in the proposal. The appropriate code(s) should appear on line 5 on the Project Summary form.

CHEMISTRY

CA12	Analytical
CB12	Biochemistry
CC12	Environmental Sciences (Chemistry)
CD12	General Chemistry
CE12	Organic
CF12	Physical
CG12	Chemistry, other (specify)

EARTH SCIENCES

EA49	Environmental Sciences (Earth Sciences)
EB42	Geochemistry
EC42	Geography (physical)
ED42	Geology
EE42	Geophysics
EF49	Earth Sciences, other (specify)

ENGINEERING

NA51	Aeronautical
NB51	Architectural
NC59	Bioengineering
ND53	Chemical
NE54	Civil
NF55	Electrical or Computer
NG56	Engineering Science
NH59	Environmental Science (Engineering)
NI56	Industrial
NJ57	Materials
NK56	Mechanical
NL57	Metallurgical
NM59	Nuclear
NN59	Petroleum
NO59	Sanitary
NP59	Engineering, other (specify)

LIFE SCIENCES

BA69	Agriculture
BB62	Anatomy
BC63	Biochemistry
BD61	Botany (incl. Plant Physiology)
BE61	Cellular Biology
BF61	Ecology
BG61	Entomology
BH49	Environmental Sciences (Life)
BI61	General Biology
BJ61	Genetics
BK61	Horticulture
BL63	Microbiology
BM61	Molecular Biology
BN63	Physiology
BO61	Soil Science
BP61	Zoology
BQ63	Life Sciencs, other (specify)

MATHEMATICAL SCIENCES

MA21	Algebra or Number Theory
MB21	Applications of Mathematics (incl. Biometrics & Biostatistics)
MC21	Calculus
MD21	Computer Science
ME21	Geometry
MF21	Intro. College Mathematics
MG21	Logic or Foundations of Mathematics
MH21	Probability and Statistics
MI21	Mathematics, other (specify)

PHYSICAL SCIENCES

ZA11	Astronomy
ZB42	Atmospheric Sciences (excl. Meteorology)
ZC42	Metallurgy (excl. Met. Engr.)
ZD41	Meteorology

PHYSICS

PA13	Acoustics
PB13	Atomic and Molecular
PC13	Environmental Sciences (Physics)
PD13	General Physics
PE13	Nuclear
PF13	Optics
PG13	Solid State
PH13	Theoretical Physics
PI13	Physics, other (specify)

PSYCHOLOGY (excluding clinical)

YA79	Developmental
YB72	Environmental Sciences (Behavioral)
YC71	Experimental, Comparative
YD79	General Psychology
YE71	Physiological
YF79	Psychometrics
YG72	Social
YH79	Psychology, other (specify)

SOCIAL SCIENCES

SA81	Anthropology (specify)
SB89	Archaeology
SC82	Economics (excl. Bus. Admin.)
SD89	Environmental Sciences (Social)
SE89	Geography (other than physical)
SF83	History and Philosophy of Science
SG84	Linguistics
SH85	Political Science
SI89	Sociology (not incl. social work)
SJ89	Social Sciences, other (specify)

APPENDIX E

SUMMARY
PROPOSAL BUDGET

	FOR NSF USE ONLY
ORGANIZATION AND ADDRESS	PROPOSAL NO.
	DURATION (MONTHS)
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR	PROPOSED / REVISED

NSF USE	A. SENIOR PERSONNEL (LIST BY NAME; SHOW NUMBERS OF PEOPLE IN BRACKETS; SALARY AMOUNTS MAY BE LISTED ON SEPARATE SCHEDULE) GPM 205.1b	NSF FUNDED MAN MONTHS CAL.	ACAD.	SUMR.	FUNDS REQUESTED BY PROPOSER	FUNDS GRANTED BY NSF (IF DIFFERENT)
	1. P.I./P.D.				$	$
	2. CO P.I./P.D.				$	$
	3. CO P.I./P.D.				$	$
	4. CO P.I./P.D.				$	$
	5. CO P.I./P.D.				$	$
11115	6. ( ) ◄—— SUBTOTALS A1 - A5 ——►				$	$
	FACULTY AND OTHER SENIOR ASSOCIATES (ATTACH EXTRA SHEET IF NECESSARY)					
	7.				$	$
	8.				$	$
	9.				$	$
	10.				$	$
	11.				$	$
11117	12. ( ) ◄—— SUBTOTALS A7 - A11 ——►				$	$
	B. OTHER PERSONNEL (LIST NUMBERS IN BRACKETS)					
11141	1. ( ) POSTDOCTORAL ASSOCIATES				$	$
11149	2. ( ) OTHER PROFESSIONALS				$	$
11150	3. ( ) GRADUATE STUDENTS				$	$
11152	4. ( ) UNDERGRADUATE STUDENTS				$	$
11182	5. ( ) SECRETARIAL - CLERICAL				$	$
11183	6. ( ) TECHNICAL, SHOP, OTHER				$	$
	TOTAL SALARIES AND WAGES (A+B)				$	$
11200	C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				$	$
	TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				$	$
	D. EQUIPMENT (LIST ITEMS AND DOLLAR AMOUNTS FOR EACH ITEM)					
23181	TOTAL EQUIPMENT				$	$
	E. MATERIALS AND SUPPLIES					
32630					$	$
	F. DOMESTIC TRAVEL					
42111					$	$
	G. FOREIGN TRAVEL (LIST DESTINATION AND AMOUNT FOR EACH TRIP; GPM 731)					
42112					$	$

PAGE 1 OF 2 PAGES

SUMMARY PROPOSAL BUDGET

PROPOSAL NO.

52500	H. PUBLICATION COSTS/PAGE CHARGES	$	$
62315	I. COMPUTER (ADPE) SERVICES	$	$
	J. CONSULTANT SERVICES (IDENTIFY CONSULTANTS BY NAME AND AMOUNT; GPM 516)		
		$	$
	K. PARTICIPANT SUPPORT COSTS, IF ALLOWED BY PROGRAM GUIDE (ITEMIZE) GPM 518		
	1. STIPENDS $		
	2. TRAVEL $		
	3. SUBSISTENCE $		
	4. OTHER - SPECIFY $		
	5. TOTAL PARTICIPANT COSTS (K1 + K2 + K3 + K4)	$	$
	L. ALL OTHER DIRECT COSTS (List items and dollar amounts. Details of subcontracts, including work statements and budget, should be explained in full in proposal.)		
	$		
	$		
	$		
	$		
65001	TOTAL OTHER DIRECT COSTS	$	$
	M. TOTAL DIRECT COSTS (A THROUGH L)	$	$
	N. INDIRECT COSTS (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks.)		
74100	TOTAL INDIRECT COSTS	$	$
	O. TOTAL DIRECT AND INDIRECT COSTS (M + N)	$	$
74500	P. LESS RESIDUAL FUNDS (If for further support of current project; GPM 252 and 253)	$	$
75000	Q. AMOUNT OF THIS REQUEST (O MINUS P)	$	$

REMARKS

NOTE: SIGNATURES REQUIRED ONLY FOR REVISED BUDGET (GPM 233). THIS IS REVISION NO.

SIGNATURE OF PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR	DATE OF SIGNATURE	TYPED OR PRINTED NAME AND TITLE
SIGNATURE OF AUTHORIZED ORGANIZATIONAL REPRESENTATIVE	DATE OF SIGNATURE	TYPED OR PRINTED NAME AND TITLE

FOR NSF USE ONLY

INDIRECT COST RATE VERIFICATION			PROGRAM OFFICER APPROVAL
Date Checked	Date of Rate Sheet	Signature	

Grant Number	Amend No.	Institution	Organization	Fund Acct.	Program	Object	

	Proposal Number	Dur.	Chg.	Award Date	Proposed Amount	Propd. Dur.	

PAGE 2 OF 2 PAGES

APPENDIX F

NATIONAL SCIENCE FOUNDATION
Washington, D.C. 20550

FINAL PROJECT REPORT
NSF FORM 98A

PLEASE READ INSTRUCTIONS ON REVERSE BEFORE COMPLETING

PART I–PROJECT IDENTIFICATION INFORMATION

1. Institution and Address	2. NSF Program	3. NSF Award Number
	4. Award Period From To	5. Cumulative Award Amount

6. Project Title

PART II–SUMMARY OF COMPLETED PROJECT *(FOR PUBLIC USE)*

PART III–TECHNICAL INFORMATION *(FOR PROGRAM MANAGEMENT USES)*

1. ITEM *(Check appropriate blocks)*	NONE	ATTACHED	PREVIOUSLY FURNISHED	TO BE FURNISHED SEPARATELY TO PROGRAM	
				Check (√)	Approx. Date
a. Abstracts of Theses					
b. Publication Citations					
c. Data on Scientific Collaborators					
d. Information on Inventions					
e. Technical Description of Project and Results	▨				
f. Other *(specify)*	▨				

2. Principal Investigator/Project Director Name *(Typed)*	3. Principal Investigator/Project Director Signature	4. Date

NSF Form 98A (5-78) Supersedes All Previous Editions

Form Approved OMB No. 99R0013

INSTRUCTIONS FOR FINAL PROJECT REPORT
(NSF FORM 98A)

This report is due within 90 days after the expiration of the award. It should be submitted in two copies to:

National Science Foundation
Division of Grants and Contracts
Post-Award Projects Branch
1800 G Street, N.W.
Washington, D.C. 20550

INSTRUCTIONS FOR PART I

These identifying data items should be the same as on the award documents.

INSTRUCTIONS FOR PART II

The summary (about 200 words) must be self-contained and intelligible to a scientifically literate reader. Without restating the project title, it should begin with a topic sentence stating the project's major thesis. The summary should include, if pertinent to the project being described, the following items:

- The primary objectives and scope of the project.
- The techniques or approaches used only to the degree necessary for comprehension.
- The findings and implications stated as concisely and informatively as possible.

This summary will be published in an annual NSF report. Authors should also be aware that the summary may be used to answer inquiries by nonscientists as to the nature and significance of the research. Scientific jargon and abbreviations should be avoided.

INSTRUCTIONS FOR PART III

Items in Part III may, but need not, be submitted with this Final Project Report. Place a check mark in the appropriate block next to each item to indicate the status of your submission.

a. Self-explanatory.
b. For publications (published and planned) include title, journal or other reference, date, and authors. Provide two copies of any reprints as they become available.
c. Scientific Collaborators: provide a list of co-investigators, research assistants and others associated with the project. Include title or status, e.g. associate professor, graduate student, etc.
d. Briefly describe any inventions which resulted from the project and the status of pending patent applications, if any.
e. Provide a technical summary of the activities and results. The information supplied in proposals for further support, updated as necessary, may be used to fulfill this requirement.
f. Include any additional material, either specifically required in the award instrument (e.g. special technical reports or products such as films, books, studies) or which you consider would be useful to the Foundation.

APPENDIX G

Check List for Proposal Submission

Complete proposals help to expedite the review process and assist the applicant in meeting program requirements. The following check list is provided as an aid to assuring proposal completeness.

☐ Complete and mail Intent to Submit card (back cover)

☐ Cover Page (all items completed on requested format, Appendix A)

☐ Affix required signatures (Principal Investigator & Authorizing Official)

☐ Project Summary (use requested format, see Appendix D)

☐ Budget (see Appendix E)

☐ Narrative (double-spaced, 30 pages maximum, numbered at bottom)

☐ Other Commitments of Senior Personnel

☐ Vitae of Senior Personnel (put into Appendix)

☐ Review for protection of human subjects

☐ Equipment certification if any item exceeds $10,000

☐ Written approval from responsible authority for pre-college students' participation in project activities

☐ Complete Acknowledgement Cards (back cover)

☐ Twelve copies of proposal

APPENDIX H

NATIONAL SCIENCE FOUNDATION		**PROPOSAL EVALUATION REPORT**
PROPOSAL NO.	PROGRAM MANAGER	PROGRAM BROCHURE DISE/SEDR
RINCIPAL INVESTIGATOR	INSTITUTION	PLEASE RETURN BY

Verbatim but anonymous copies of reviews will be sent only to the principal investigator/project director on request. Subject to this NSF policy and applicable laws, including the Freedom of Information Act, 5 USC 552, reviewers' comments will be given maximum protection from disclosure.

ARRATIVE COMMENTS (Continue on additional sheets--front side only--if necessary)

PLEASE BE SURE TO CHECK ONE BOX

☐ I RECOMMEND THAT THE FOUNDATION AWARD SUPPORT FOR THIS PROJECT SUBSTANTIALLY AS PROPOSED.

☐ I RECOMMEND THAT THE FOUNDATION AWARD SUPPORT FOR THIS PROJECT SUBJECT TO ATTENTION BEING GIVEN TO RESOLVING THE WEAKNESSES NOTED.

☐ I RECOMMEND THAT THE FOUNDATION NOT AWARD SUPPORT FOR THIS PROJECT.

PLEASE COMPLETE SUMMARY SHEET

EVIEWER'S NAME	REVIEWER'S SIGNATURE
NSTITUTIONAL AFFILIATION	

SF FORM 989 (3-77)

PROPOSAL NO.	PROGRAM MANAGER	PROGRAM BROCHURE DISE/SEDR
PRINCIPAL INVESTIGATOR	INSTITUTION	PLEASE RETURN BY

SUMMARY

MAJOR STRENGTHS	MAJOR WEAKNESSES AND SUGGESTIONS FOR IMPROVEMENTS

REVIEWER'S NAME	REVIEWER'S SIGNATURE
INSTITUTIONAL AFFILIATION	

APPENDIX I

EVALUATION CRITERIA

Formal proposals are evaluated according to the quality, merit and significance of the projected results and of the design of activities to achieve those results. Reviewers will examine proposals and submit comments based on the following criteria:

1. *Quality.* Does the conceptualization of the problem and the proposed solution show imagination and creativity? Are resources of high quality to be employed in attacking the problem? Would the promised results significantly improve some aspect of science education? Does the activity have high intrinsic merit? Is the science involved good science?

2. *Rationale.* Are the project objectives clear and relevant to the goals of DISE? Has the proposal identified an important need, problem, or issue in science education—is this a good idea? Have the developers demonstrated knowledge of both the science and the pedagogy that is pertinent, current, and reasonably complete? Is the rationale supporting the project adequate to justify the investment of Federal funds? Is there an appropriate Federal role in supporting this activity?

3. *Project Design.* Does the proposal articulate a well-formulated plan of attack on the problem identified? Is the proposed approach likely to be a practical and effective way to solve the problem? Are the management plan and the dissemination plan well conceived?

4. *Impact.* Would successful completion of this project be likely to make a significant difference in science education? Are the expected results, products, or outcomes sufficiently novel so as not to unnecessarily duplicate other efforts? Do these products have the potential for adoption or adaptation by educators in other settings? Are the proposed procedures for dissemination and utilization of the products likely to be effective? Does the project capitalize in a timely way upon other current or impending developments and trends in its field? Does it effectively exploit available cross-linkages or momentum? Would you predict that its effects will be lasting?

5. *Cost-effectiveness.* Is there evidence that project outcomes will be cost effective? Will the improvements in quality justify the cost? Will they provide the same quality at reduced cost? Are any inherent high risks offset by a potentially high payoff if the project succeeds?

6. *Evaluation.* Are there good procedures for formative and summative evaluation? Are there suitable plans for obtaining reliable and unbiased information on product effectiveness, limitations, replication in other settings, continuation costs, etc.?

7. *Personnel and Institutional Resources.* Is the staff well qualified to carry out the roles assigned to them? Are there any serious personnel gaps unrecognized or unfilled? Are the services and conditions necessary to support the project activities available?

8. *Budget.* Are the costs of the project—salaries, services, and other expenses—reasonable? Does the budget reflect a realistic assessment of the magnitude of the task?

90%